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Electronic Industries Association

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November 25, 1987

Mr. William Tricarico
Secretary
Federal Communications Commission
Room 222
1919 M Street, N.W.
Washington, D.C. 20554

Re: Consumer Electronics Group/
Electronic Industries Association filing
in MM Docket 87-268

Dear Mr. Tricarico:

The attached chart, Figure 2 referred to on page 5, was unintentionally left out of this filing.

Please add it to EIA/CEG's filing.

Sincerely,

Gary J. Shapiro
Staff Vice President
Government and Legal Affairs
Consumer Electronics Group

Attachments

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Advanced Television Systems and Their Impact on the Existing Television Broadcast Service	)	MM Docket No. 87-268 RM -5811
Review of Technical and Operational Requirements Part 73-E. Television Broadcast Stations	)	
Reevaluation of the UHF Television Channel and Distance Separation Requirements of Part 73 of the Commission's Rules	)	

COMMENTS OF THE CONSUMER ELECTRONICS GROUP of the ELECTRONIC INDUSTRIES ASSOCIATION

These comments are submitted by the Consumer Electronics Group of the Electronic Industries Association (EIA/CEG) in response to the August 20, 1987 Notice of Inquiry into advanced television (ATV) systems. EIA/CEG represents manufacturers and marketers of television receivers and VCRs all of whom, have a strong interest in this Inquiry. Consumer use of TV sets could be effected as the Commission is re-examining the extent to which UHF television stations are protected against interference from other television stations.

While TV manufacturers clearly have an important stake and interest in many aspects of the Commission's advanced television system

proceeding, EIA/CEG's comments at this time are limited to a few narrow technical issues. EIA/CEG comments are confined to the issue of interference and are intended to be consistent with its comments and reply comments file in Docket 20485, Reevaluation revision of the UHF TV "taboo" table, filed October 31, and December 1, 1975, respectively which are attached to this document.

Summary

EIA/CEG views relaxation of the UHF taboos and additional UHF allocations necessary for certain ATV systems as two distinctly separate subjects. The former is based exclusively on NTSC transmissions. The interference potential of the latter signals is not known and may be "tailored" for minimum interference to existing allocations, permitting a higher quality service while at the same time not increasing interference to the existing service.

Relaxation of the taboos would result in increased interference and a reduction in quality of service, (except as related to receiver performance improved over that assumed when the taboos were adopted). TV receivers either in the U.S. or elsewhere demonstrate the potential to improve significantly performance relative to the taboos.

Receiver manufacturers have started an effort to gain an understanding of the interference potential of two-channel ATV

systems based on extension of the work done in the UHF-land mobile proceeding (Gen. Docket 85-172); however, there is insufficient time to include this in an EIA/CEG filing.

Comparison Between UHF Performance and "VHF Reference Performance"

The Commission states that, "In the present re-examination of the UHF taboos there are new elements to be considered, including additional receiver test data and possible reinterpretation of the relationship between the test data and the taboos" (72), and cites a "Technical Memorandum," a study of UHF Television Receiver Interference Immunities, [1] which has been placed in the official docket file in this proceeding. The Commission states that a comparison of the UHF performance with VHF receiver performance has one of three outcomes:

> (a) The UHF performance is better than the VHF performance. This is interpreted as suggesting relaxation of the UHF taboo.
>
> (b) The UHF performance is about the same as the VHF performance. This is interpreted as suggesting modifying the UHF taboo with a prohibited zone stipulation, meaning locating stations adequately close together (almost equal signal levels or adequately far apart (desired signal sufficiently greater than undesired).
>
> (c) The UHF performance is poorer than the VHF performance. This is interpreted as suggesting that the UHF taboo should be maintained.

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[1] FCC/OET TM-1, 08/87

The Commission suggests that on the basis of preliminary results using this new concept, changes to the UHF taboos appear feasible. This conclusion is based on the use of median receiver data. Analysis based on the "median receiver" (or "mean receiver") ignores half the receiver population. For assessing current receiver production (or the receiver population), the lower decile values are a more true measure and reflect the accepted statistical practice. Additionally, there may be no such thing as a "median receiver", as a given receiver may exhibit a wide variation in performance over the tuning range for any taboo.

The co-channel taboo was established in 1952 on the basis of a 28dB desired/undesired signal ratio with a 10kHz offset that produced an "acceptable" television picture. Painstaking testing conducted at the CBS Technology Center has established that viewers expectations are much higher today and that a 28dB D/U ratio produces a picture quality that is unacceptable to both expert and non-expert viewers alike.[2] Today's receivers have much lower noise and better picture performance than those of the era in which the 28dB figure was derived.

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[2] Subjective Assessment of Protection Ratios for UHF Broadcast Signals," B.L. Jones (Apr. 23, 1986), Technical Advisory Committee Working Group Document WG-1.55. Just as receiver design improved, so too has psychophysical science advanced greatly in recent years.

It should be noted that the data in the memorandum are for "just perceptible" interference, not a 28dB D/U ratio. Other taboos have objectionability different from co-channel and change more rapidly as the D/U ratio changes (e.g., the half-IF taboo). The FCC measurements were mainly made between channels 30 and 40 and do not necessarily reflect the performance at either channel 14 or channel 69. Comments follow on specific taboos based on the memorandum and other information.[3]

Comment on Relaxation of Specific Taboos IF Beat (n + 8 channels)

Figure 2 from the memorandum is attached with the VHF and UHF lower decile and UHF lower range performance added. It illustrates that a change in this taboo is not justified. The UHF lower decile performance is not as good as the VHF lower decile performance.

Intermodulation (n + 2, 3, 5 channels) These data are not plotted; however, the lower decile performance is 6 to 10 dB poorer than the mean for n+2 and n+4 (Test No.3). No change appears justified.

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[3] It should be noted that the taboos are all n plus and minus x channels even though the receiver spurious response may be n plus x channels. EIA/CEG views creation of "one-sided" taboos of limited value and administratively unworkable.

The intermodulation taboo is based on the 1952 mechanical tuner that exhibited better selectivity than the varactor tuners found in most color TV receivers today. Today's varactor tuners have RF amplifiers, needed to meet the Commissions 14dB noise figure requirement. As a result there are areas (e.g., California) where the 20 mile separation between n + 2 stations is marginal. Therefore, revision of this taboo is not considered prudent.

Oscillator Radiation (n + 7 channels) and IF Beats (n + 7 channels).

EIA/CEG concurs with the Technical Memorandum finding that the dominance of local oscillator radiation for a seven channel taboo had diminished. EIA stated in Docket 20485 in 1975: .1m12

> "Oscillator radiation currently is one fourth the value assumed for receivers at the time the taboos were established and the average is expected to decrease with time as a larger proportion of the receiver population has UHF varactor tuners"

The IF beat caused by the n + 7 sound carrier will require the protection similar to the n + 8 IF beat protection of 20 miles.

Half-IF Taboo (n + 4 channels)

This newly named taboo is important because it represents a non-linear type of interference. That is, it more quickly becomes objectionable compared with a linear type of interference such as co-channel or image. It is therefore not considered a good candidate for modification.

Sound Image Taboo(n + 14 channels) and Picture Image Taboo (n + 15 channels)

EIA/CEG sees no benefit in "fine tuning" the sound taboo even though sound power has been reduced 4.5dB compared with that permissible in 1952 when the taboos were established. The spread in receiver performance should also be considered.

Picture image performance, as noted in paragraph 75 of the Inquiry and TM-1, is significantly poorer than that of the VHF reference. The picture image rejection data in TM-1 indicate that EIA/CEG's suggestion in comments filed in Docket 20485 that a "tracking image trap" significantly improves performance and not borne out in practice. The picture image taboo should not be changed.

Adjacent Channel Taboo (n +14 channel)

It should be noted that even the FCC (RFM) advanced technology receiver only shows significant improvement for an n + 1 undesired channel. Being one-sided, it doesn't help if there is an assignment at n +2 channels (i.e., it appears as an n-1 channel). Responses to the questions in paragraph 78 of the Notice follow:

> 16. The present taboos were adopted in 1952 and have remained unchanged since that time. What taboos should be eliminated or modified and what impact would this have on existing television service?

The oscillator taboo could be modified as indicated previously without impacting the existing television service.

17. In re-evaluating the effect of taboos generally, what percentage of viewers should be protected?

In terms of television receiver performance, at least 90 percent of the receivers should be protected. Some corrective action should be available to viewers who have the 10% of unprotected receivers.

18. Are the conclusions concerning the "VHF reference" criteria described in this proceeding justified? Should the taboos be modified as suggested in this proceeding?

Comparisons should be made, not on median performance, rather on the lower decile of VHF performance versus the lower decile of UHF performance. The data in FCC/OET TM-1 show the performance spreads of VHF cross modulation from median to lower decile is much less than many UHF performance spreads from median to lower decile. In this case, matching medians does not achieve matching lowest decile performance.

The assumption that the absence of complaints means acceptable VHF performance is dubious. A more complete study of the actual problems is needed.

In general the approach used does not provide an accurate evaluation of the possible problems that would be caused by the relaxation of specific taboos. An approach that directly relates taboo relaxation to the potential problems would be a better approach.

Also, to get statistically significant data on lowest decile receiver performance requires sampling much more product, from a wider variety of manufacturers, a wider variety of designs, and both new and old (0-10 years) product.

19. Because of the taboos, only 9 (at most) UHF channels can be assigned to any given city.

a. To what extent could broadcasters take advantage of the "gaps" in the allocation table to transmit auxiliary information for advanced TV systems?

The gaps in the existing allocation would seem to represent an opportunity for new systems if proper attention is given to avoiding interference with existing transmissions.

b. Should new assignments made possible by elimination or modification of taboos be reserved for advanced TV system use, opened for licensing to new full service stations, or used for other purposes?

The key criteria for the new assignments, if possible, should be to have the minimum negative effect on existing services. New full power NTSC TV broadcast stations would have a know negative

effect. Use with an advanced TV system could be defined to have a minimal negative effect.

20. a. How might future improvements in television receivers affect susceptibility to taboo frequencies?

Future improvements as demonstrated in the advanced technology receiver must consider the need to tune all VHF, UHF and cable channels. Agreement is needed on a protected first IF frequency. At present this can only be done at a significant cost premium. The customer will not perceive an improvement unless a problem exists. The change cannot be justified from market forces.

Major improvement is difficult for intermodulation, cross modulation or adjacent channels. Only cost effective high performance devices that don't presently exist will result in major improvement. The FCC(RFM) advanced technology receiver is not considered a cost or performance effective design. The concept, as first implemented by Texas Instruments, is ten years old and still cannot be found in the marketplace. It can not accommodate cable channel tuning because of the choice of the first intermediate frequency and the frequency coverage (i.e., broadcast and cable-only channels). VHF noise figures are not as good as current production receivers. And this is "one of a kind" (i.e., a sample "tweeked" for best performance); the data presented in

TM-1 are not "statistical". The industry is trying and is succeeding in improving performance with conventional designs as evidenced by the data for some receivers for some test for some tests in TM-1:

> b. Are advanced TV signals (including any auxiliary signals or augmentation channels) likely to be more, or less,susceptible to current taboo frequencies? Will new taboo frequencies arise?

Auxiliary signals (or augmentation channels) are likely to have much lower interference potential compared with NTSC signals. The developers of any ATV systems are quite aware of the interference problems and will endeavor to "craft" the auxiliary TV signal accordingly. Without knowing the format of such a signal it is not possible to predict if it would be more susceptible to NTSC interference (than another NTSC signal) or whether new taboo frequencies would arise.

> c. Are changes in receiver designs likely to cost effectively reduce the susceptibility of receivers to taboo frequencies for NTSC signals?

The receiver designers consider the taboos along with overall performance and cost in achieving new designs. It is unlikely that future receivers will be designed to eliminate taboo requirements unless new technology makes new compromises possible. New approaches are continually being evaluated.

> d. What are the anticipated costs of taboo-immune TV receivers and the time frame for significant market penetration?

The cost increase with present known approaches would be significant compared to existing tuner costs. The minimum time for real market penetration would be more than ten years from introduction. This does not include the three years necessary for receiver development. EIA Marketing Services Department data [4] indicate that ten years after purchase, 75-80 percent of color TV's are still working and in use. It takes about 15 years for half of all sets to go out of use.

21. Should the Commission take action now to encourage reduced generation of and susceptibility to taboos, either on channels used for NTSC or advanced TV signals? Is so, what action is appropriate. e.g., spectrum allocation, interference criteria, or other?

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[4] EIA Color Television Replacement Cycle Study, April 1985. Also referenced in the Technical Advisory Committee Final Report, May 7, 1986, Gen. Docket 85-172

EIA/CEG considers that gathering information on this question falls within the scope of the Advisory Committee on Advanced Television Service. The Commission should wait until interested parties have commented on a Committee report before acting.

Conclusion

EIA/CEG appreciates the Commission's effort to insure the viability of advanced television systems. Television receiver manufacturers ask, however, that the Commission recognize the question of relaxation of taboos and allocation of additional VHF channels are two different issues capable of independent analysis and Commission action.

Respectively submitted,

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Electronic Industries Association
by:
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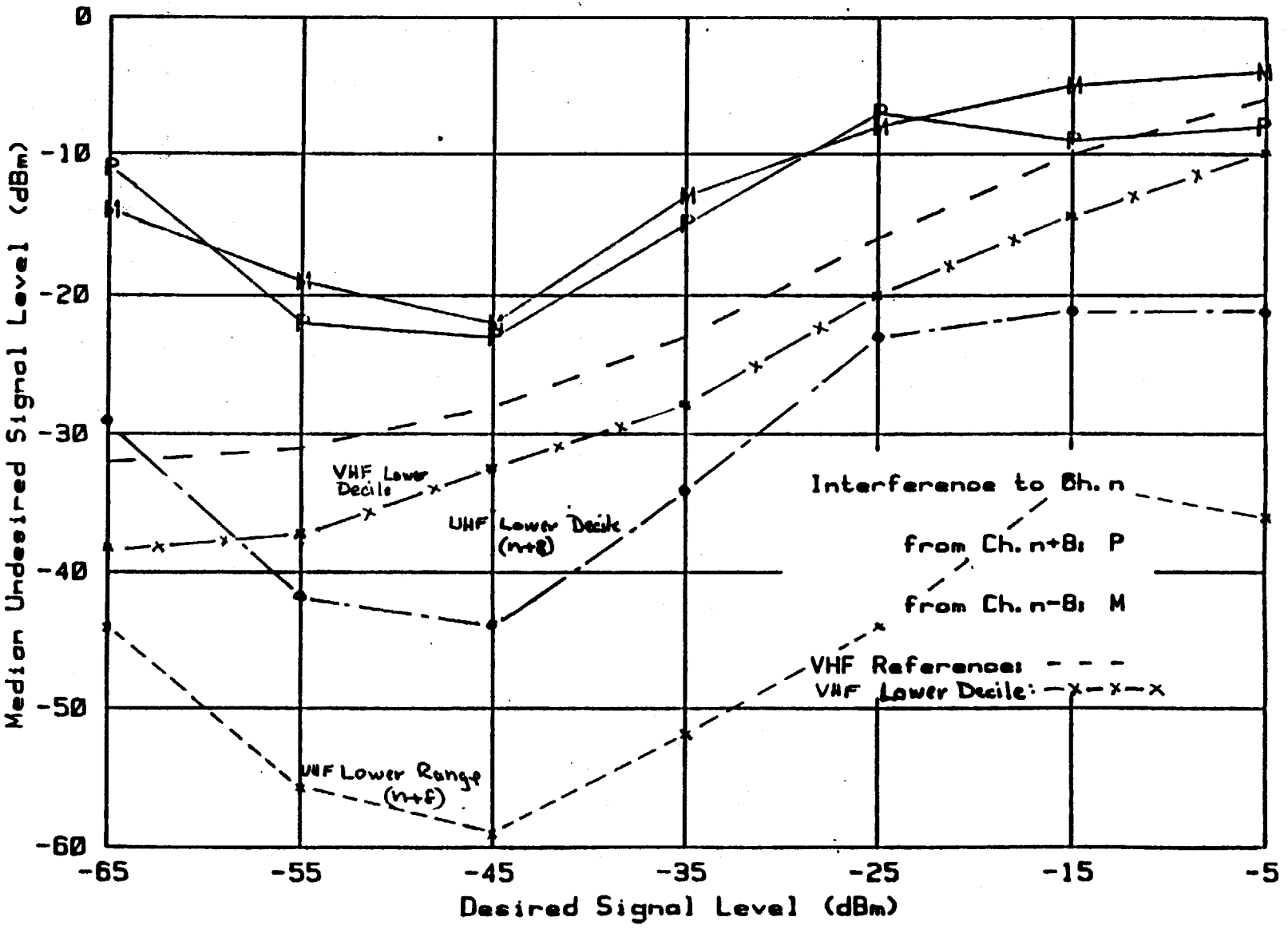
November 17, 1987

Figure 2: "Just Perceptible" Interference, UHF TV IF Beat



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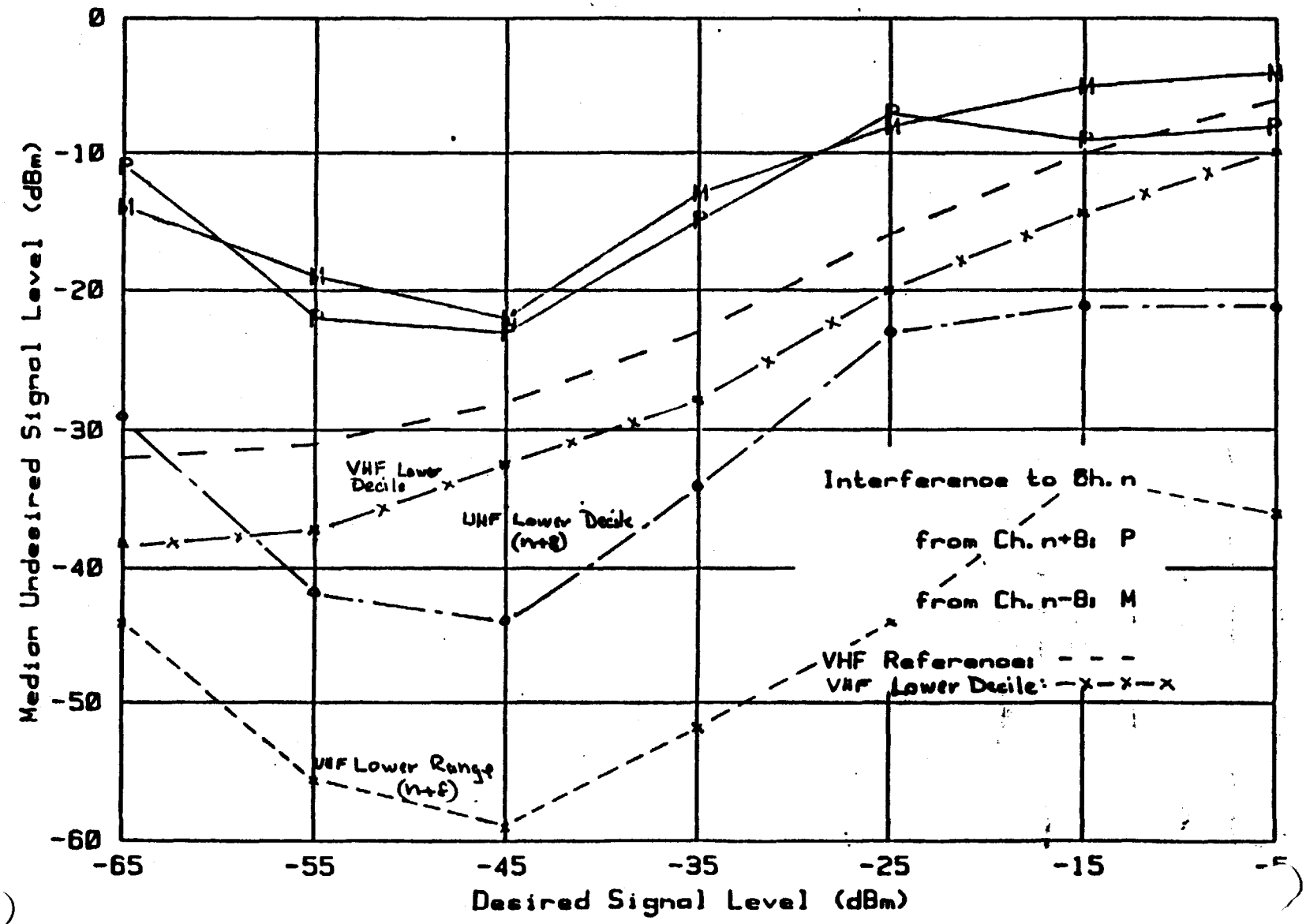

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